



InterActive 4 Dumb Terminal

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PARTS:

- [Basic Stamp 2 \(1\)](#)

SUMMARY

Here we are making a dumb terminal out of an old DMC 16117A 1x16 LCD display. The first thing to do is to get a serial interface for the display. I am using a [SparkFun SerLCD](#) for this. The 16117A only has 14 connectors and that is fine. The 15 & 16 connections on the SerLCD are for the back light LEDs. Just carefully cut the header and remove those connectors. Install the SerLCD on to the 16117A. Connect Power, Ground and Rx to your processor port. Serial communications parameters are vanilla 9600 baud, 8 bits even or true, 1 Start bit, 1 Stop bit, no parity.

I am just using fragments of my code for this article. It is the same code I used for the Serial EEPROM article. I just changed the output drivers to handle the 16117A display.

The code text is on [Let's Make Robots](#) and [Instructables](#).

If you want back lights you will have to remove the mirror backing on the 16117A. On mine the foil was on another piece of plastic. I removed all of it. The lights can be anything. Connect them plus voltage to 15 and ground on 16.

I do not remember when I got my 16117A. It was one of the first LCD displays available for processor boards way back in the mid 90's. No one did much with it because of its horrible

tedious parallel interface. The serial interfaces now make it great for a dumb terminal attached to a processor board like the Basic Stamp 2. You still have to baby this display and the processor board helps. Power glitches and static discharge send the 16117A into uncontrollable states that only a correct series of commands can fix. The Parallax BASIC should be easy to translate into other systems.

The 16117A controller is for multi-line displays. The 16 -display is really two 8-byte lines in the display's memory; 0-7 for the first line and 64-71 for the second line. In my program to make the cursor position you add the control character 128 to it. That tells SerLCD that it is a cursor position. The memory is a mess. See the manual.

Having the SerLCD gives you all those pins to do other things with. Run switches for user feedback. Run things for the user interface. Make a bigger interactive thing. The display keeps the users informed. And the 16117A looks almost normal thanks to the other processor board. Just to send a long string to the display you need a processor. Send first 8 letters then set the cursor position and print the rest of the string to the display. That is what my interface does.

Every processor board supports network serial communications on most of their pins. Networks must have the grounds connected or they will not understand each other. Minimum is Rx and Ground. Long network cables should be shielded twisted-pair cables. Pull-up resistors is all you need. About 47K. See my InterActive articles. I have not got the network stuff done yet, so no code file this time. I wish I had friends to share this with. I am a very lonely geek in LA.

Step 1 — InterActive 4 Dumb Terminal

InterActive 4 Dumb Terminal

The Serial Interface from SparkFun.com.
Use 9600 baud even or true, 1 Start bit, 1 Stop bit, No Parity. Maybe re-programmed through the ICSP port.
See the manual.

InterActive 4 Interactive Thing

The layout is up to you

By Steven R Cyphered
See my
Interactive
Articles

InterActive 4 A 16117A FIX

The 16117A has many problems so here is my fix for this 1x16 display. All numbers are in Decimal. Command = Function: Parts

```
***  
IF tmp1 = 80 THEN  
  DEBUG DEC tmp1 //Command set  
  DEMO128 DEC tmp2 //Enter the fix  
  IF tmp2 = 30 THEN  
    FOR tmp3 = 10 TO 15  
      SEROUT Dsp1, 84, [DspCmd1] //Must be even  
      SEROUT Dsp1, 84, [DspCmd2] /40 = F12: DL 4L, N 2 line, F 5x7  
      SEROUT Dsp1, 84, [DspFunc] /Data Lines 4  
      PAUSE 5 /Number Lines 2  
      SEROUT Dsp1, 84, [DspClear]  
      tmp5 = 8  
      SEROUT Dsp1, 84, [DspCmd1] /1z + Cn D on, C off, B off  
      SEROUT Dsp1, 84, [DspCurOn] //Display On  
      PAUSE 5 //Cursor Off  
      SEROUT Dsp1, 84, [DspCurOff] //Link Off  
      PAUSE 5  
      SEROUT Dsp1, 84, [DspCmd1] /1 = Clear display  
      PAUSE 5  
      SEROUT Dsp1, 84, [DspCmd1] //Display On  
      SEROUT Dsp1, 84, [DspClear] /Cursor Off  
      PAUSE 5  
      SEROUT Dsp1, 84, [DspCurOff] //Link Off  
      PAUSE 5  
      SEROUT Dsp1, 84, [*Done*]  
      ENDIF  
      GOTO StringOut  
  ENDIF
```

By Steven R Cyphered

- SparkFun.com Serial LCD interface
- Dumb Terminal
- 16117A FIX

Step 2

InterActive 4 16117A Displaying a Long String

Because of the 16117A controller being for multi-line displays the addressing is a mess.

```
Hello DMC16117A      The 1 line 16117A is two 8 byte lines 64  
1234567890123456   bytes from the first line.  
DO  
  myStr(tmp4) = myStr(tmp3)  
  tmp4 = tmp4 - 1 //Move Hi 8 Up one  
  tmp3 = tmp3 - 1  
  LOOP UNTIL (tmp3 < 8)  
  myStr(tmp2) = 0  
  SEROUT Dsp1, 84, [STR myStr]  
  PAUSE 10  
  tmp3 = 64 + 128 'Set Address to Line 2  
  SEROUT Dsp1, 84, [DspCmd1]  
  SEROUT Dsp1, 84, [tmp3]  
  PAUSE 15  
  tmp3 = 0  
  tmp4 = tmp2 + 1  
  DO  
    myStr(tmp3) = myStr(tmp4)  
    tmp3 = tmp3 + 1 //Move Hi 8 to front  
    tmp4 = tmp4 + 1  
    LOOP UNTIL (tmp3 > 7)  
    myStr(8) = 0  
    SEROUT Dsp1, 84, [STR myStr]  
    EXIT  
  ENDIF  
  NEXT'Go through string  
noDspStr:  
  IF DspStr = 0 THEN  
    DEBUG DEC tmp1, ". ", STR myStr, CR  
  ENDIF  
  DspStr = 0  
  NEXT'Read in strings  
HIGH epCn 'Set Chip Select High - Close Command  
epAddr = myStrS * 16 /Reset Address  
GOTO CmdDisplay
```

...
IF DspStr = 0 THEN noDspStr
DEBUG DEC tmp1, ". ", STR myStr, CR
SEROUT Dsp1, 84, [DspCmd1]
SEROUT Dsp1, 84, [DspClear]
PAUSE 10
FOR tmp2 = 0 TO 15'Go through string
 IF myStr(tmp2) = 0 AND tmp2 < 8 THEN
 SEROUT Dsp1, 84, [STR myStr]
 EXIT
 ENDIF
 IF tmp2 = 8 THEN /Start Second line
 tmp4 = 16
 tmp3 = 15
 By Steven R Cyphered ...

● Display a long String

Fun

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